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REPORT

OF

Professor M'Clune,

ON THE

SOLAR ECLIPSE

OF

August 7th, 1869.

PHILADELPHIA:
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1869.

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OFFICE OF THE

CONTROLLERS OF PUBLIC SCHOOLS,

FIRST DISTRICT OF PENNSYLVANIA.

Philadelphia, Nov. 10, 1869.

AT a Meeting of the Controllers of Public Schools, First District of Pennsylvania, held at the CONTROLLERS' CHAMBER, Tuesday, November 9th, 1869, the following Report of Professor M'Clune, on the late Eclipse of the Sun, was ordered to be printed.

From the Minutes.

H. W. HALLIWELL,

SECRETARY.

REPORT.

To Messrs. James Freeborn, Charles M. Lukens, Stephen H. Smith, Andrew Nebinger and William Ridings, Committee on High School.

Gentlemen:—In compliance with your request and the invitation of Professor J. H. C. Coffin, who had the general superintendence of the expeditions sent by the Government of the United States to observe the late solar eclipse, I accompanied the party organized in this city for that purpose, to Burlington, Iowa. Finding, however, after our arrival there, that a sufficient number of astronomers was already connected with each of the stations assigned to the photographers, from this and some of the adjoining States, Professor Gummere, President of Haverford College, and myself, suggested to Professor Coffin the advantage of selecting some other locality for a place of observation. The suggestion received his approval, and as calculations made with great care showed that the central line of totality would pass either through or very near to Oskaloosa, a village one hundred miles north-west of Burlington, and besides, so far as could be learned, it had not been occupied by any of the astronomical corps, we concluded to make it the base for our operations.

In pursuance of this determination we reached the village on Friday, August the sixth, and immediately proceeded to choose a suitable place for making observations. As a natural elevation about half a mile north of the main street of the village gave us an unobstructed view to the north and west, and a good view of the country for miles around, a temporary observatory was erected on it and the telescopes placed in position.

The places of the planets Mercury, Venus, Mars and Saturn, and of Arcturus, Regulus, Alpha Lyrae, and some other stars of the first magnitude, likely to be visible, were noted; a page of the English Nautical Almanac, containing specimens of both the large and the small type used in that publication, was selected to be read during the totality, as a means of estimating the darkness; the assistance of several residents of the village, to mark the height of the barometer and thermometers, was obtained, and every preparation made which the means at our command afforded. All being in readiness, each of us took his position at his telescope, a few minutes before the beginning of the eclipse, and awaited the first contact. This took place exactly at the point on the sun's limb where it was expected, but a few seconds later than the time assigned by calculation.

The first and the last contact, and the beginning and the end of the total phase, were successfully observed, the height of the barometer and of the thermometers exposed to the sun and in the shade, was carefully marked, many of the phenomena that occurred were accurately noted, and the time at which the moon reached the first and also the second of the large spots then visible on the surface of the sun, was observed and recorded.

The most interesting objects which present themselves during a total eclipse of the sun, are the corona or halo which appears around the dark body of the moon when the sun is entirely obscured, ruby-colored or flame-like protuberances seemingly in immediate contact with the margin of the lunar disc, and luminous streamers or radiations from the brightest parts of the corona. These, and other phenomena observed while the total phase continued, are shown in the annexed drawing sketched before the end of the eclipse.

A, brightest part of the corona. At B, the radiation was less luminous than at A, but it extended farther and was interspersed with parallel orange-colored rays. At C, several streaks of orange-colored light were observed. At D, the extension was brighter than in the corona proper, but it was not so bright as at A, B or C. At E, a large rose-colored protuberance appeared, resembling somewhat a balloon or inverted bell pear. Estimated by the eye, its height or length was at least one-twentieth of the disc, or upwards of forty thousand miles. At F, a circular ruby-colored protuberance, not so large as the one on the lower limb, was visible the entire period of totality. During some seconds, pink-colored flames spread themselves along the limb on each side of this protuberance, and then faded away. Pink-colored flames also appeared at the part of the limb opposite G, but soon became invisible.

The luminous streamers or radiations from the corona, arranged themselves nearly opposite, and gave it an appearance not unlike a St. Andrew's Cross. The remaining portions of the corona were by no means uniform in brightness, even for short distances, *lighter* and *darker* portions being intermingled.

The breadth of the corona proper, instead of being, as commonly represented, everywhere the same, was very unequal, while in some places it reached to a distance of more than two hundred thousand miles; in other places, and those generally where the rose-colored flames appeared, it did not extend to more than half that number of miles.

Arcturus, and the planets Mercury and Venus, were visible during the whole of the total phase. The former planet, owing to its nearness to superior conjunction, exhibited a brilliancy which none of those present had ever seen.

From fifty minutes and forty-four seconds past three o'clock, when the eclipse began, until fifty-eight minutes and thirty-seven seconds past four, or two minutes and thirty-five seconds after the end of the totality, a thermometer exposed to the direct rays of the sun fell nineteen degrees, while the mean of two others in the shade showed a difference of nine degrees during the same interval.

As the moon advanced over the disc of the sun, the decrease of light became more and more apparent, the distant hills assumed a sombre hue, or faded from the sight; the wind, which blew briskly at the beginning of the eclipse, ceased; even the clamor of the boys of the village who had gathered to scan our instruments and watch our operations was hushed; a death-like paleness gradually diffused itself over the countenances of all, and when the last faint crescent of the solar light was obscured, gloom and silence seemed to have taken possession of the earth and the living beings around.

In consequence of the short duration of the total phase, a little less than three minutes, it could not be expected that the effect on animals would be manifest as it has been in some eclipses of the sun, in which the total obscuration lasted twice as long, nevertheless it was distinctly seen. Bees came swarming to the hives, swallows sought their places of nightly abode, cattle huddled together in the fields, and fowls hastened to the roost.

During the totality, dew was deposited on the grass in the public square of the village, and a chilly sensation was felt, which seemed to indicate a greater change of temperature than the three degrees shown by the thermometer.

The effect produced by the shadow of the moon passing over the earth at the rate of forty miles a minute, the moment previous to the total obscuration, is said, by those who saw it, to have been as wonderful and startling as any of the

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strange events which occurred when the sun was entirely hidden.

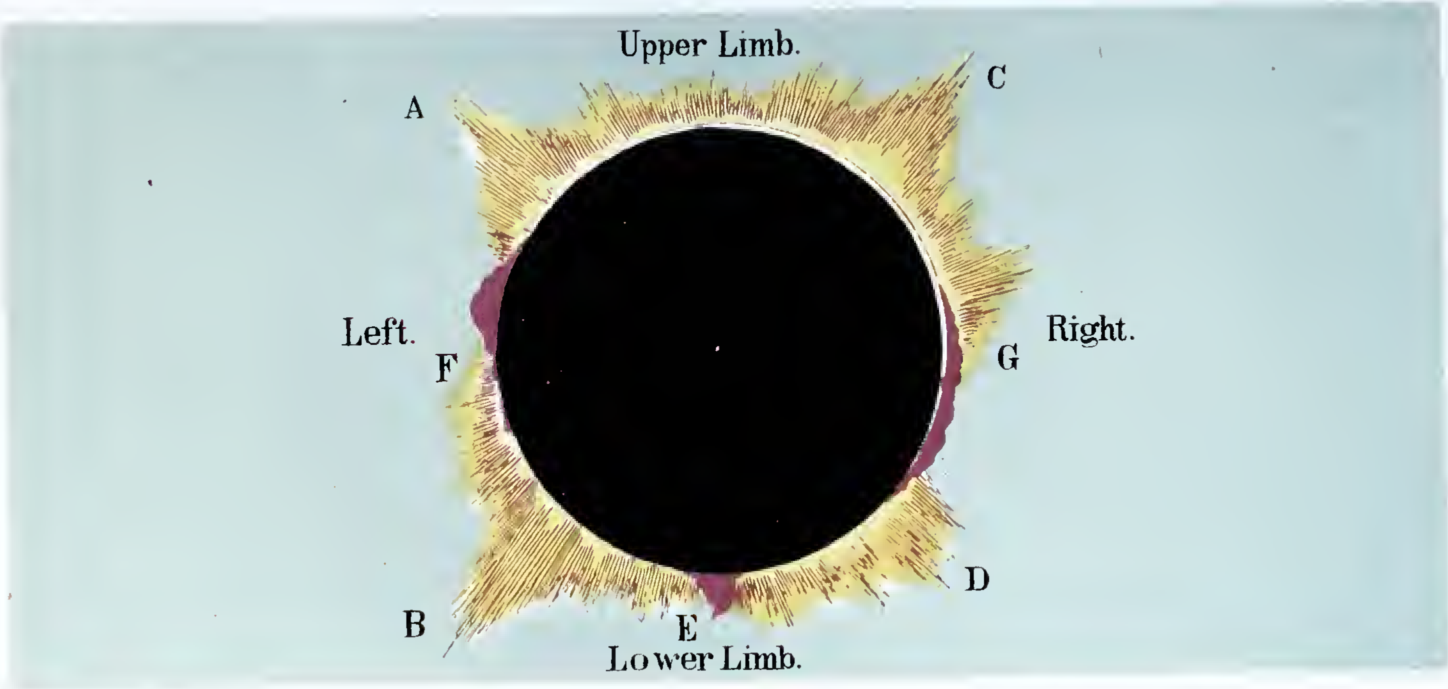
Among the noteworthy incidents connected with the eclipse, not the least interesting is the eager desire which was manifested by every class of the community to learn something respecting it, and to witness the unusual phenomena which presented themselves during its continuance. While it lasted, business was wholly suspended. The eyes of all were turned towards the heavens, and there are few, if any, among the five thousand inhabitants of Oskaloosa, who will ever forget the mingled feelings of surprise, astonishment and awe which they experienced during the two hours and one minute that the rare, but impressive and sublime exhibition of nature was presented to their view.

JAMES M'CLUNE.

September 20th, 1869.

SOLAR ECLIPSE

OF AUG, 7th, 1869.



APPEARANCE DURING THE TOTAL PHASE,

AS

OBSERVED AT OSKALOOSA, IOWA,

BY

Professors' M'Clune And Gummere.